

to the sun, ranging from -6.1 km. (September 23, 1906) to -15.3 km. (October 29, 1904).

The velocities determined for ζ Cygni vary only from +14.3 km. to 15.7 km. (*Astronomische Nachrichten*, No. 4181, p. 87).

MINOR PLANETS DISCOVERED DURING 1906.—In No. 21 (p. 261, May 23) of the *Naturwissenschaftliche Rundschau* Prof. Berberich discusses the minor planets discovered during 1906. In all, the discovery of 126 of these objects was announced, but of these thirteen were undoubtedly objects which had been seen before, whilst sixty-nine await further observation. The orbits of twenty are now known to be elliptical, whilst twenty-one others are probably so; in three cases a circular orbit fits the observational results better. Prof. Berberich gives a comparison between the orbital elements now determined and those previously calculated for the asteroids shown to be identical with bodies discovered earlier. The magnitudes, designations, and details of discovery are also given for those probably having elliptical paths.

THE SPECTRUM OF SATURN.—The results of a photographic study of the spectrum of Saturn, made by Mr. V. M. Slipher during the autumn of 1905, appear in Bulletin No. 27 of the Lowell Observatory. The spectra were taken on plates especially sensitised to the orange-red, and extend to λ 6563. The comparison spectrum, photographed on either side of the planet's spectrum, was that of the moon at about the same altitude, so that differential effects of the earth's atmospheric absorption were eliminated. The following absorption bands appear in the Saturnian spectrum, their relative strengths being in the order given:— $\lambda\lambda$ 6193, 5430, 6145, 645, 577.

The first named is a very strong band, broad and symmetrical, and traceable down to the band at λ 6145. None of these bands is to be found in the spectra of the rings, although a much weaker absorption than that producing λ 6193 should be indicated if it existed. This points to the conclusion that if the rings possess any atmosphere at all it is much rarer than that surrounding the ball of the planet. No trace of absorption due to the presence of aqueous vapour is shown on the spectrograms.

Mr. Slipher also gives an interesting comparative table of the spectra of the four outer planets, Saturn, Jupiter, Uranus, and Neptune, which indicates that the planets which are similar telescopically have similar spectra. The excellent plate accompanying the paper shows reproductions of the spectra of these four planets taken with various comparisons.

OXFORD UNIVERSITY OBSERVATORY.—The thirty-second annual report of the Savilian professor of astronomy, dealing with the period May 1, 1906, to April 30, 1907, contains but little which is of general interest.

The proof-reading and printing of the astrographic results for the Oxford zone have occupied the time of the staff fully during the past year, and will, with the necessary re-measurement and checking, continue to do so for some few years; consequently, no other serious piece of work can be undertaken. Vols. i. (zone +31°) and ii. (zone +30°), and the greater part of vol. iii. (zone +29°), are now printed, the two former being also bound.

CELEBRATION OF THE BICENTENARY OF LINNÆUS.

THE Linné Fest¹ which has just come to an end was a complete success in every way. The meeting was admirably managed, and the delegates were treated with the most generous hospitality. Upsala² they were especially indebted to the Rector of the University (Dr. Schück) and to Mr. Axel Andersson, of the University library. The last-named gentleman was tireless in his efforts to rule his troublesome pack, and, indeed, lost his voice in that service, and became as hoarse as a huntsman after a long day. Many of the delegates arrived on

¹ An interesting gathering took place on May 21 at Råshult, the birthplace of Linnæus, where a ceremony was arranged, including a visit to the church in which he was christened. Many delegates attended at the invitation of the Rector of the University of Lund.

² Modern spelling reform has converted the name to Uppsala.

May 22; the remainder reached Upsala by special train on the morning of May 23—the first day of the Fest. At the station they were met by the students of the University, looking uncommonly smart in dress coats and white caps, their fuglemen decorated with huge blue and yellow scarves. They struck us as a very fine set of young men as they marched past with their banners and saluted us. The guests were also honoured by the presence of the women students, who wore white caps like those of the men, which they removed in a masculine manner by way of salute to the assembled delegates. At mid-day was held the great meeting in the Aula of the University, when the delegates presented their addresses, heard the oration of the Rector, and listened to Holmgren's hymn in honour of Linnæus and Liljeoss's music to Snoilsky's poem "The Prince of Flowers."

The delegates of each nation formed a group, and the groups went up in alphabetical order, beginning with America and ending with Österrike (Austria), the modified o being the last letter in the Swedish alphabet. Each group had a leader, who made a short speech as he passed the Rector's throne, this office being performed for England by Sir Archibald Geikie with conspicuous success. It was a relief to those delegates who are not quite clear about Latin quantities to find that addresses were merely handed in. After their leader's speech the delegates descended into the body of the hall, filed past the Crown Prince and other Royal personages with bows of varying degrees of elegance, and so got safely back to their seats.

Among the delegates were the following well-known men of science:—Profs. Farlow, Harvard; Warming, Copenhagen; Elfving, Helsingfors; Prince Roland Bonaparte, Académie des Sciences, Paris; France being also represented by MM. Flahault, Giard, and Mangin; Profs. Moll, Holland; Wille, Christiania; Borodin and Palladin, St. Petersburg; Casimir de Candolle, Geneva; Engler, Berlin; Goebel, Munich; Haeckel, Jena; Pax, Breslau; Peter, Göttingen; Pfeffer, Leipzig; Wiesner, Vienna. Halle had the distinction of being represented by a mathematician, Prof. Wangerin, who came as the president of the Leopold. Car. Academy. The delegates from "Storbritannien och Irland" were:—Sir A. Geikie, Royal Society; Dr. Bather, British Museum and Zoological Society; Mr. Carruthers, Linnean Society; Mr. F. Darwin, Cambridge and the Royal Society; Mr. Daydon Jackson, who was personally invited; Mr. Morice, Entomological Society; Prof. Poultton, Oxford; Lieut.-Colonel Prain, Kew Gardens; Dr. Rainy, College of Physicians, Edinburgh, and the University; Dr. Church, Edinburgh. The Society of Arts of London was represented by the Swedish professor Sjögren. Great Britain was in the proud position of having more delegates than any other nation. Prof. Bailey Balfour, whose name occurs on the official list, was unfortunately absent.

At the conclusion of the meeting the delegates were presented to the Crown Prince, who afterwards conferred the Order of the Polar Star on some of them, among whom were Mr. Daydon Jackson and Prof. Poultton.

The festivities were not nearly concluded. There was a concert at 4.30 p.m. given in the Botanic Garden by the students, whose remarkably finished singing was much admired.

In the evening the guests were divided between the hospitable tables of the Rector and the Archbishop. At the Rector's party, the toast of the Linnean Society was given by our host, whose generous reference to the Linnean treasures in London was warmly appreciated by the Englishmen present. The evening concluded with a grand reception in the University buildings.

On the following day (May 24) was held a great "promotion" of doctors, which by a revival of ancient custom took place in the cathedral. The building was filled with a great crowd, and the students again gave a picturesque touch by their massed white caps. The proceedings began with the creation of thirty Swedish D.D.'s named by the King and "promoted" by the Archbishop.

Then came Doctors of Law and Medicine, among the latter being Dr. Rainy, of Edinburgh. Prof. Haeckel was in a class by himself as a Jubilee Doctor. Each M.D. was presented with a remarkable headdress, being, in fact, a tall hat covered with pleated black material, and with these they were respectfully crowned by the promoter. A re-

markable feature in the ceremony was the firing of a cannon as each candidate was promoted. The delegates were reminded of another Scandinavian land the King of which gave command to "let the kettle to the trumpet speak, the trumpet to the cannoneer without." In Upsala the trumpet and kettle-drum seemed to be replaced by the electric button.

The Doctors in Philosophy were promoted by Dr. Tycho Tullberg, a collateral descendant of Linnaeus. The ceremony consisted in placing a gold ring on the finger and a "laurel crown" on the head of each candidate; in the case of the honorary doctors the crown was made of leaves from a bay tree planted by Linnaeus. The British doctors were Mr. Carruthers, Mr. F. Darwin, Sir A. Geikie, and Mr. Daydon Jackson. Among the Swedish doctors was the deservedly popular Prince Eugen, who has made for himself a reputation as an admirable landscape painter.

In the evening there was a great banquet in the Aula of the University, and an evening entertainment given by the students.

On Saturday, May 25, the delegates departed for Stockholm, where the Linne Fest was continued by the Royal Swedish Academy under the auspices of Count Mörner, the president. Here again the delegates were met with excellent arrangements and a warm welcome. A solemn meeting of the academy was held at which the delegates presented addresses, speeches were made, and a cantata was sung, of which the words were by G. Retzius, the music by Valentin. To the general satisfaction of all the delegates, and to the especial delight of those from Britain, the Linnean gold medal of the academy was awarded to Sir Joseph Hooker, and handed to Sir Rennell Rodd, the British Ambassador, for transmission to England. A beautiful bronze medal given to each delegate forms a particularly attractive memento of a memorable occasion.

In the evening a great banquet was given, at which the speeches were made by the president of the academy (Count Mörner), the Crown Prince, Prince Roland Bonaparte, and the Prime Minister. Later in the evening the students gave an entertainment at Skansen, the beautiful zoological and ethnological garden of Stockholm.

One of the most striking features of the Fest was the interest shown in it by the Royal House. The Crown Prince and Princess and other members of the Royal Family were present at the meetings and banquets both at Upsala and Stockholm. The Crown Prince mingled with the guests with a kindness that was much appreciated by the delegates, and the same may be recorded of the other members of the Royal House. A garden-party given by the Crown Prince on Sunday was somewhat marred by the break-up of the fine weather which had added so much to the effect of the Upsala gathering.

Finally must be mentioned the generosity of the authorities of Upsala and Stockholm in presenting the delegates with a valuable reproduction of the portraits of Linnaeus and a reprint of his works, including a facsimile of the first edition of the "Systema Naturae."

CELEBRATION AT THE LINNEAN SOCIETY.

The reception held by the Linnean Society of London on Friday, June 7, as part of its celebration of the bicentenary of Linnaeus, was attended by nearly three hundred guests, many of whom were ladies. The Swedish Minister, some of the Swedish Legation, and several other Swedes were amongst those present. The president of the society, Prof. Herdman, F.R.S., and Mrs. Herdman, received the guests in the library, and prominent among the exhibits were many interesting personal relics of the great naturalist—selections from his herbarium, cases of Lepidoptera, Coleoptera, fishes, and shells, including the celebrated artificial pearls produced by the native fresh-water mussel.

The beautiful medallion by Inlander, which was copied by Josiah Wedgwood, occupied a conspicuous position, and was surrounded by a laurel wreath from the recent festival held at Upsala on May 23 and 24, which was lent by one of the British representatives who received an

honorary degree there. A large series of medals which had been struck at various times in honour of Linnaeus also were set out in the same case; they included Count Tessin's medals of 1746 and 1758, Ljungberger's large medal, struck by command of Gustaf III. in 1778 on the death of Linnaeus, and many of a later date. Recent medals were also shown, such as the Linnean medal of the society, a special copy of which had been presented to the Royal University of Upsala last month, and, latest of all, a bronze copy of the bicentenary medal, struck for the Royal Swedish Academy of Sciences, and awarded on May 25 to Sir Joseph Hooker, G.C.S.I., F.R.S. Two cases contained the correspondence between Linnaeus and our own countryman, John Ellis, F.R.S., the letters on both sides being shown; manuscripts of great interest, copies of books interleaved and copiously annotated by Linnaeus, his Lapland diary, and his note-book for the eventful year which witnessed his departure from Sweden to take his medical degree at Harderwijk, and the issue of his "Systema Naturae" in 1735. The foregoing were shown by the Linnean Society, in whose possession they have been since the death of Sir J. E. Smith, the first president, in 1828.

Dr. Tempest Anderson displayed photographs showing the growth of vegetation in St. Vincent since the volcanic eruption in 1902; Prof. Dendy, preparations from his New Zealand specimens; Mr. A. D. Darbshire, Mendelian phenomena; Miss Benson and Prof. F. W. Oliver, the spermatozoid bodies in the fossil seeds of *Lagenostoma* and *Physostoma*; Prof. Farmer, apogamic growths from fern-prothallia; and the president, specimens of pearl oysters and plankton gatherings taken during the present spring. Animated photographs of plant-life were shown by Mrs. D. H. Scott, and many other objects of great interest were on view in the library and the galleries.

During the evening a series of short lectures was given in the meeting room by the following:—Prof. Poulton, Prof. Herdman (who prefaced his remarks by a short discourse on the present Linnean celebration), Lieut-Colonel Prain, and Mr. F. J. Lewis. The rooms were not deserted until nearly midnight.

THE ROYAL OBSERVATORY, GREENWICH.

See also

THE report of the Astronomer Royal to the Board of Visitors, on the work done at the Royal Observatory during the period May 11, 1906, to May 10, 1907, was presented on Saturday, June 8, when the annual visitation took place. A brief summary of this report is given below.

In addition to the routine observations, the transit-circle was employed on a number of stars, of the ninth magnitude and brighter, which may be used as reference stars for the Oxford astrographic zones; 7704 transits were taken during the year.

The second nine-year catalogue (epoch 1900) will probably be ready for press before the end of the current year, and will be divided into two parts, (1) fundamental and zodiacal stars, (2) astrographic reference stars.

The reflecting prism for illuminating the field of the altazimuth has been replaced by a smoothly ground reflector of opal glass, cemented on to the object-glass, and this gives a much more uniform illumination. The observations of the moon and of the lunar crater Mösting A were continued, and, discussed with the similar observations carried out at the Cape Observatory, should give an improved value for the lunar parallax.

The new working list for the 28-inch refractor primarily includes double stars discovered by Hough, and during the year 400 pairs were observed, fifty-eight of them having a separation of less than 0'.5. The equatorial and polar diameters of Jupiter were measured by the methods described in the previous report, these measures being intended to supplement those made during the opposition of 1895-6. The diameters of the satellites were also measured on two nights with the filar micrometer.

When the 30-inch mirror on the Thompson equatorial was taken out for re-silvering, in November, 1906, it was found to be slightly loose in its cell, so, before re-mounting,